Amendment to the Claims

Claim 1. (Original) An irreversible humidity indicator card, comprising

an intermediate carrier member, containing one or more holes passing through the intermediate carrier member,

a water vapor permeable, clear, first outer layer secured to a front side of the intermediate carrier member,

a deliquescent material contained within the holes in the intermediate carrier member,

a dark colored, absorbent sheet material placed against a back side of the intermediate carrier member, which material covers the holes in the intermediate carrier member, and

a second outer layer, secured to the back side of the intermediate carrier member, which covers the colored, absorbent sheet material.

Claim 2. (Original) The irreversible humidity indicator card of Claim 1, wherein the water vapor permeable, first outer layer is coated on one side with an adhesive material.

Claim 3. (Original) The irreversible humidity indicator card of Claim 1 wherein the second outer layer is comprised of a water vapor permeable material.

Claim 4. (Original) The irreversible humidity indicator card of Claim 1 wherein the second outer layer is coated with an adhesive material.

Claim 5. (Original) The irreversible humidity indicator of Claim 1 wherein the second outer layer completely covers the back side of the intermediate carrier member.

Claim 6. (Original) The irreversible humidity indicator card of Claim 1 wherein the deliquescent material is selected from the group consisting of a single deliquescent salt, a mixture of two or more deliquescent salts, a mixture of a single deliquescent salt with one or more non-deliquescent salts, a mixture of two or more deliquescent salts and one or more non-deliquescent salts, a mixture of a single deliquescent salt with one or more non-ionic compounds and a mixture of two or more deliquescent salts with one or more non-ionic compounds.

Claim 7. (Original) The irreversible humidity indicator card of Claim 1 further comprising a plurality of deliquescent materials, each of which liquifies at a different, predetermined humidity level.

Claim 8. (Original) The irreversible humidity indicator card of Claim 1 wherein the clear, water vapor permeable first outer layer has a vapor transmission rate of at least about $1g/(m^2 \cdot day)$.

Claim 9. (Original) The irreversible humidity indicator card of Claim 1 wherein the colored, absorbent sheet material is produced from a colored blotting sheet.

Claim 10. (Original) The irreversible humidity indicator card of Claim 1 wherein the second outer layer covers the back side

of the intermediate carrier member.

Claim 11. (Original) The irreversible humidity indicator card of Claim 1 wherein the second outer layer is secured at one or more of its edges to the clear, water vapor permeable, first outer layer.

Claim 12. (Original) An irreversible humidity indicator card, comprising

an intermediate carrier member, containing one or more holes passing through the intermediate carrier member,

a water vapor permeable, clear, first outer layer secured to a front side of the intermediate carrier member,

a white deliquescent material contained within the holes in the intermediate carrier member,

a dark colored, absorbent sheet material placed against a back side of the intermediate carrier member, which material covers the holes in the intermediate carrier member, and

a second outer layer, secured to the back side of the intermediate carrier member, which covers the colored, absorbent sheet material.

Claim 13. (Original) An irreversible humidity indicator card, comprising

an intermediate carrier member, containing one or more holes passing through the intermediate carrier member,

a water vapor permeable, clear, first outer layer secured

to a front side of the intermediate carrier member,

a deliquescent material contained within the holes in the intermediate carrier member, wherein the deliquescent material does not include a dye material,

a dark colored, absorbent sheet material placed against a back side of the intermediate carrier member, which material covers the holes in the intermediate carrier member, and

a second outer layer, secured to the back side of the intermediate carrier member, which covers the colored, absorbent sheet material.

Claim 14. (Original) A process of manufacture of a humidity indicator card comprising

preparing an intermediate carrier member containing one or more holes, a front side and a back side,

securing a clear, water vapor permeable, first outer layer to the front side of the intermediate carrier member,

placing a deliquescent material within the holes of the intermediate carrier member,

covering the holes of the carrier member on the back side of the intermediate carrier member with a dark colored absorbent material, and

covering the colored absorbent material and the back side of the intermediate carrier member with a second outer layer.

Claim 15. (Original) A process of manufacture of a

humidity indicator card comprising

preparing an intermediate carrier member containing one or more holes and a front side and a back side,

securing a clear, water vapor permeable, first outer layer to the front side of the intermediate carrier member,

placing a deliquescent material within the holes of the intermediate carrier member,

securing a dark colored, absorbent sheet material to a second outer layer, and

securing the second outer layer with attached colored absorbent sheet to the back side of the intermediate carrier member, wherein the colored absorbent sheet material covers the holes in the intermediate carrier member.

Claim 16. (Original) The process of Claim 14 wherein the deliquescent material does not include a dye material.

Claim 17. (Original) The process of Claim 15 wherein the deliquescent material does not include a dye material.

Claim 18. (Original) The irreversible humidity indicator card of Claim 1 wherein the dark colored, absorbent sheet material is colored with a dark color, such as red, green or black.

Claim 19. (Original) The irreversible humidity indicator card of Claim 1 wherein the color of the absorbent sheet material shows through the openings in the intermediate carrier member and the clear, first outer layer when the deliquescent material melts and

is absorbed by the absorbent sheet material.

Claim 20. (Original) The irreversible humidity indicator card of Claim 12 wherein the dark colored, absorbent sheet material is colored with a dark color, such as red, green or black.

Claim 21. (Original) The irreversible humidity indicator card of Claim 13 wherein the dark colored, absorbent sheet material is colored with a dark color, such as red, green or black.

Claim 22. (New) An irreversible humidity indicator card, comprising

an intermediate carrier member, containing one or more holes passing through the intermediate carrier member,

a water vapor permeable, clear, first outer layer secured to a front side of the intermediate carrier member,

a deliquescent material contained within the holes in the intermediate carrier member which liquifies at a predetermined humidity level,

a dark colored, absorbent sheet material placed against a back side of the intermediate carrier member, which absorbent material covers the holes in the intermediate carrier member and is capable of absorbing the liquified deliquescent material when it liquifies, and

a second outer layer, secured to the back side of the intermediate carrier member, which covers the colored, absorbent sheet material.

Amendments to the Claims

None of the original claims have been amended. The applicants assert that these claims are patentable over the cited prior art.

New Claim 22 has been added which clarifies that the deliquescent material liquifies at a predetermined humidity level. Further, new Claim 22 claims that the dark colored, absorbent sheet material is "capable of absorbing the liquified deliquescent material when it liquifies." The remaining claim elements of Claim 22 are based on Claim 1. Basis for the material added to Claim 1 to form Claim 22 is contained on page 12, line 22 through page 13, line 19 and page 19, lines 11 - 23. No new subject matter is introduced by this claim.

Double Patenting Rejection

The USPTO rejected Claims 1 - 21 under the judicially created doctrine of obviousness-type double patenting based on Claims 1 and 3 -20 of U.S. Patent No. 6,698,378. In order to overcome this double patenting rejection, the applicants attach as **Exhibit A**, a Terminal Disclaimer. The applicants respectfully assert that this Terminal Disclaimer overcomes this rejection.

Claim Rejections

In paragraph 4 of the Office Action, the Examiner presumed that the subject matter of the various claims was commonly owned at the time any invention covered therein was made and advised the applicants that they are under an obligation to point out the inventors and invention dates of each claim that was not commonly owned. The applicants assert that all claims were invented by all inventors and are commonly owned.

The United States Patent and Trademark Office rejected Claims 1, 2 and 4 - 21 under 35 USC § 103 as being unpatentable over Fryar, U.S. Patent No. 3,597,976 in view of Martz, U.S. Patent No. 5,061,258. In addition, the USPTO rejected Claims 1 - 10, 12, 13, 18, 20 and 21 under 35 USC § 103 as being unpatentable over Martz in view of Fryar. The applicants respectfully traverse each of these rejections and assert that the USPTO has misunderstood and misapplied the teachings of these references, particularly Fryar.

The applicants have discovered an unique irreversible humidity indicator card comprised of an intermediate carrier member, a water vapor, permeable clear first outer layer secured to a front side of the intermediate carrier member, a deliquescent material contained within holes in the intermediate carrier member which liquifies at a predetermined humidity levels, a dark colored absorbent sheet material placed against the backside of the intermediate carrier member capable of adsorbing the liquified deliquescent material and

a second outer layer secured to the back side of the intermediate carrier member, which covers the color absorbent sheet material. The applicants have claimed various combinations of the components of this humidity indicator card in independent Claims 1, 12 and 13. In addition, the applicants have claimed in Claims 14 and 15 processes of manufacture for producing those irreversible humidity indicator cards.

The applicants respectfully assert that the combined teaching of Fryar and Martz fail to teach the invention, as claimed. In particular, the applicants respectfully assert that neither reference alone or in combination teaches a "*deliquescent material*", as that element is commonly understood by a person skilled in the art. The USPTO asserts that "Fryar discloses...a plurality of deliquescent salts(6), (such as a dimethyl Itconate, which is a white colored material)...". (Page 3, lines 3 - 5 of first paragraph of paragraph 5.) The USPTO further asserts at page 5, paragraph 3, lines 1 - 4 that "Fryar discloses... a plurality of deliquescent salts (6), (such as dimethyl Itconate, which is a white colored material...". In contrast, the USPTO acknowledges that a "deliquescent material" is not taught by Martz. "Martz does not disclose... a plurality of deliquescent salts..." page 5, paragraph 2, lines 1 - 2. Thus, the combination of Martz and Fryar will only teach a "deliquescent material", as claimed, if that deliquescent material is taught by Fryar.

Applicants assert that Fryar alone or in combination with Martz, fails to teach any "deliquescent material". To understand the teaching of Fryar, it is useful to review both the "alleged" deliquescent materials of Fryar and their use. Fryar discloses "a Clinical Temperature Bandage" containing "a plurality of chemicals having different melting points, each of which will become fluid at a different temperature...". (See Abstract.) In use, the bandage is placed against the skin of a patient. Once the particular chemicals, which are contained within openings in the bandage, are exposed to the patient's skin for a sufficient period of time, "[t]he temperature [of the patient] was recorded as equal to or higher then the highest melting temperature of any chemical that had become liquid, and lower than the lowest melting temperature of any solid that did not change phase." (Col. 1, lines 27 - 30.) In order for this bandage to accurately disclose the patient's temperature, Fryar gathered various chemicals "...with satisfactory melting temperatures... by reference to published list of chemicals... to cover the temperature spread of 98°F to 104°F." (Col. 1, lines 52 - 55.) In operation, the bandage is placed against the skin and the chemicals with a melting point below that of the skin temperature of the patient melts. The temperature of the patient is the temperature between the highest melting temperature of the chemical that has become liquid and lower than the lowest melting temperature of the chemical that has remained

solid. The chemicals selected by Fryar are disclosed at Col. 2, lines 22 - 26 with the preferred chemicals being lauric acid, with a melting temperature of approximately 114°F, and 2-ethoxy napthalene, with a melting temperature of 98°F. (See Col. 2, lines 34- 40.) Various blends of these two materials are preferably combined to form the composition that is placed within each of the slots within the bandage. (Applicants question how a mere physical blending of these chemicals will completely melt at different temperatures between the melting temperatures of the individual chemicals.) Thus, a person reviewing Fryar would look for chemicals with melting points at around 100°F. They would not be concerned about the humidity level at which these chemicals are water soluble or even if they were water soluble at all.

These chemicals of Fryar are not "desiccant materials", as claimed in applicants' application. The commonly accepted definition of a "deliquescent materials", is contained in *The Condensed Chemical Dictionary, Tenth Edition,* at page 311, a copy of which is attached as **Exhibit B**, where "deliquescent" is defined as "[t]ending to absorb atmospheric water vapor and become liquid. The term refers specifically to water-soluble chemical salts in the form of powders, which dissolve in the water absorbed from the air." (The use of a dictionary to define the meaning of terms in a claim is the accepted procedure. Inverness Medical v. Warner Lambert, 64 USPQ 2d 1933, 1936 (Fed. Cir. 2002) and Schumer v.

Laboratory Computer, 64 USPQ 2d 1832, 1838 (Fed. Cir. 2002). Thus, "deliquescent materials" as claimed in the application liquify when the amount of moisture present in the air surrounding the deliquescent material reaches a particular, predetermined level. (The particular "deliquescent material" chosen depends upon whether the user of the particular irreversible humidity indicator card wishes to indicate a low, medium or high humidity level.)

In contrast, there is no evidence that any of the chemicals disclosed by Fryar, particularly the two preferred materials, lauric acid and 2-ethoxy napthalene, are "deliquescent materials" and if so, at what humidity levels. In fact, neither lauric acid nor 2-ethoxy napthalene are soluble in water and therefore cannot be "deliquescent materials", as that term is commonly understood by a person skilled in the art. As proof thereof, see the *Handbook of Chemistry and Physics,* 57th Edition, pages C-281 and C-387 , copies of which are attached as part of **Exhibit C** which shows their insolubility in water. Further, the material cited by the USPTO as being a "deliquescent salt" i.e. dimethyl itaconate is not listed as being soluble in water on page C-503 of *The Handbook of Chemistry and Physics,* 57th Edition. (See **Exhibit C.**) Thus, the cited chemicals in Fryar are not "deliquescent materials."

This failure of Fryar to teach the use of "deliquescent materials" is not surprising as the device of Fryar functions in an entirely different manner from the device claimed by the

applicants. The device of Fryar is dependent on chemicals contained within openings in a bandage which *melt* at particular temperatures. The chemicals in Fryar were never intended to *liquify* when exposed to particular levels of moisture. There is no information in Fryar explaining whether any of the disclosed chemicals liquify in humidity. In addition, even if the chemicals disclosed in Fryar did liquify when exposed to some levels of moisture at a temperature that was lower than the temperature of the patient, then they would not function to disclose the temperature of the patient. Thus, no person reading Fryar who was trying to choose "deliquescent materials" would look to the disclosure in Fryar as those chemicals were chosen to react to temperature not humidity.

In contrast, the device of the applicants is designed to use "deliquescent materials" which melt when exposed to a particular level of moisture. If the chemicals disclosed by Fryar were substituted in the openings in the applicants' card, the applicants' device would not function as described, as the preferred Fryar chemicals would not *liquify* at predetermined humidity levels. In fact, the applicants' device containing the Fryar chemicals would give a false reading as to the level of moisture present if it was exposed to a temperature of around 100°F, regardless of the humidity level. [Humidity indicator cards are often used in hot tropical environments or in metal shipping

containers where the temperature is often greater than 98°F.]

It is also interesting to note that the chemicals utilized as "deliquescent materials" by the applicants would not function in the Fryar device. The melting points of the deliquescent salts disclosed in the application at page 13, lines 5- 11, melt at temperatures far above those that would be useful in a thermometer. Some examples follow: $ZnCl_2$ (283°C), $ZnBr_2$ (394°C), LiCl (605°C), LiBr (550°C), and LiI (449°C). See *Handbook of Chemistry and Physics,* 57th Edition, pages attached as part of **Exhibit C.** These high melting temperatures were specifically chosen to avoid the possibility of false readings when the cards were used in hot, but not necessarily humid, conditions.

Thus, the preferred chemicals in Fryar are not "deliquescent materials" as claimed and the chemicals disclosed in the application are not the type of chemicals that would function to show the particular temperatures, as required by Fryar. Accordingly, the applicants respectfully assert that the combination of Fryar and Martz fails to teach this important element of the invention.

The applicants also assert that new Claim 22 is allowable as it provides even further distinctions by stating that the "deliquescent material" is designed to liquify at a predetermined humidity level. The preferred chemicals materials that are disclosed in Fryar are not water soluble and therefore, can not

liquify at any predetermined humidity level. Accordingly, Claim 22 is also allowable over the combination of Fryar and Martz.

The applicants further assert that an additional distinction exists between the device, as claimed in the claims of the application, and the combination of Martz and Fryar. The applicants assert that neither Fryar nor Martz nor their combination teach "a dark colored, absorbent sheet material." The only dark material that is disclosed in Fryar is the ink from the printed numbers. The particular material that absorbs the chemicals as they melt in Fryar is not dark and in fact, is required to be light in color to contrast with the color of the ink of the printed numbers. Thus, the combination of Fryar and Martz fails to disclose this additional element of each claim of the application.

Accordingly, the combination of Fryer and Martz fails to disclose the inventions, as claimed, in the claims of the application.

CONCLUSION

The applicants respectfully assert that they have overcome each rejection of the claims of the application and request the issuance of a Notice of Allowability. If there are any questions concerning this matter, please contact applicants' counsel.

Respectfully Submitted,

Scott R. Cox
Reg. No. 31,945
LYNCH, COX, GILMAN & MAHAN, P.S.C.
400 West Market Street, Suite 2200
Louisville, Kentucky 40202

CERTIFICATE OF SERVICE

I hereby certify that this correspondence is being deposited with the United States Postal Service in a first class mail envelope addressed to Mail Stop Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: August 13, 2004 Holly Hart

SRC:hh
C:\SRC\patent\p1021\P1021A amend1.wpd
8-11-04
93420